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(58) Field of search

B8U

Selected US specifications from IPC sub-class G07F

(54) Control and monitoring of dispenser, e.g. for cigarettes

(57) A dispensing device for articles (2) of fixed shape, for example, boxes, cartons or tins, comprises a housing (1), including means (3) for defining a plurality of rows of the articles (2) to be dispensed, the housing being arranged such that the next article to be dispensed in each row is visible to the operator, and the dispenser including gating means for retaining the articles to be dispensed in a withdrawn position within the housing such that the articles cannot be removed from the dispenser; means (5) for entry of an operator identity; means (5) for selecting an article to be dispensed; and means for producing a signal following entry of operator identity and selection of an article to be dispensed, to cause the gating means to retract temporarily to allow a single article to be dispensed, the gating means being activated during removal of the article to prevent removal of further articles from the same row as the article removed.

Fig.1.

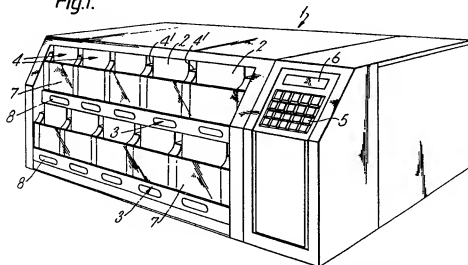


Fig.1.

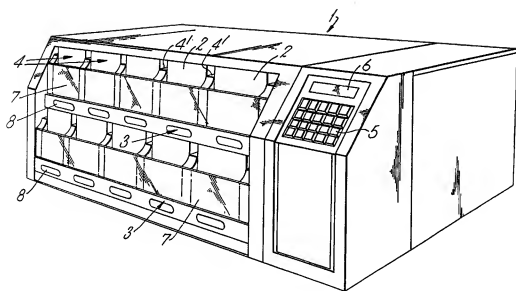


Fig. 2.

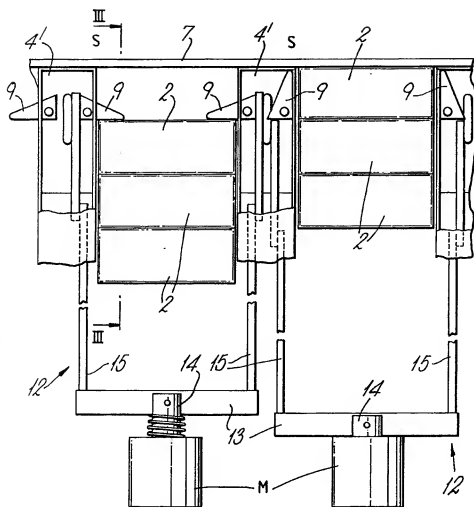


Fig. 3.

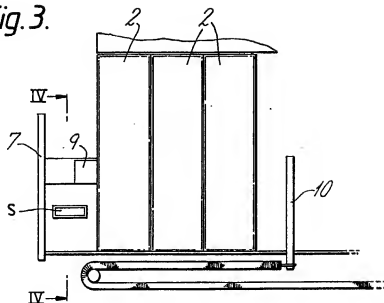


Fig. 4.

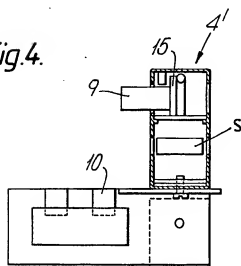


Fig. 5.

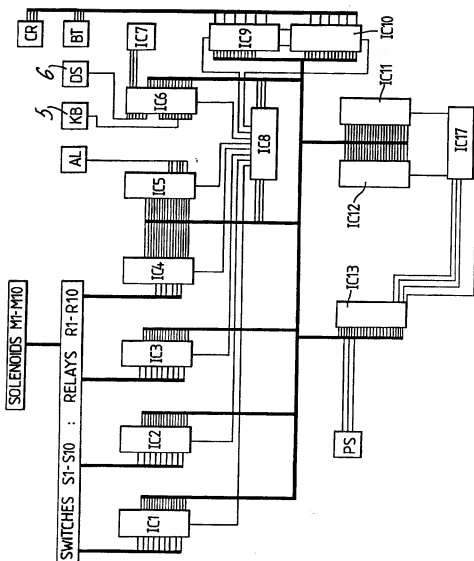
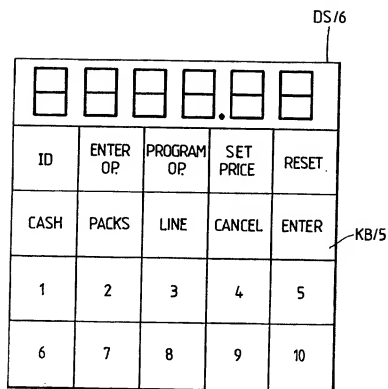


Fig. 6.



SPECIFICATION

Dispenser

- 5 The present invention relates to a dispenser for dispensing articles of fixed shape, for example packets of cigarettes, boxes of sweets etc. In particular, however, the dispenser is particularly useful for dispensing packets
- 10 of cigarettes.

- A very common method of marketing packets of cigarettes is by way of vending machines into which the purchaser must insert the required amount of money before the cigarettes are vended to him by the vending machine. Such vending machines are common in bars and public houses for example, having been introduced primarily to overcome the problem of pilfering. However, as the vending machine has to be accessible by the customer directly, rather than by a member of staff, and as such vending machines are generally not an attractive article of furniture, they are usually located in a passageway or entrance lobby
- 20 which means that a customer buying a drink from the bar say has to go elsewhere to purchase his cigarettes. Furthermore he has to have the correct coinage to do this which may involve a member of staff opening the till to change coins for the customer.

- It can be seen therefore that whilst such vending machines may overcome the problem of pilferage by staff they do, by virtue of location and appearance, tend to be a nuisance to the customer and off-putting to use. Furthermore, as vending machines are often located outside the main area of the bar or public house most of the time they are not in view of the staff and can therefore be vandalised or
- 40 broken into and the cigarettes stolen.

- In our GB-A-2154563 we describe a dispenser designed to provide an indication of staff pilferage (and thereby help to reduce it) which may be positioned for example behind a bar for staff operation in order to overcome some of the problems mentioned above. That dispenser comprises a housing; a plurality of drawers for storing a row or rows of articles to be dispensed, each drawer being movable between a substantially closed position retracted within the housing and an open position in which it is partially removed from within the housing for loading articles into the row or rows in the drawer, the arrangement
- 55 being such that only a single one of the articles stored in each row can be removed at a time from the drawer when the drawer is in its closed position, means for sensing the removal of an article from each row and providing a signal indicative of the removal; means for preventing or indicating insertion of an article into a row which is in its closed position; and means for receiving an article removal signal and maintaining a count of the total of
- 60 articles removed from each row.

By means of such a dispenser an accurate count of the number of articles removed from each row can be maintained so that, by checking the cash till figures against the dispenser count any pilfering can be spotted quickly. Furthermore, by preventing or monitoring the insertion or re-insertion of an article when the drawers are in closed positions, an effective method of preventing staff from selling their own products is provided.

- However, the need to reduce staff pilferage to minimum levels is now becoming even more important and therefore, to achieve this, it is desirable if the identity of the member of a staff dispensing article can be monitored so that a comparison can be made with articles dispensed and cash till operation and the receipt of appropriate money for the article being dispensed.

- According to the present invention therefore a dispensing device for articles of fixed shape, for example, boxes, cartons or tins, comprises a housing, the housing including means for defining a plurality of rows of the articles to be dispensed, and the dispenser including gating means for retaining the articles to be dispensed in a withdrawn position within the housing such that the articles cannot be removed from the dispenser; means for entry of
- 85 an operator identity; means for selecting an article to be dispensed; and means for producing a signal following entry of operator identity and selection of an article to be dispensed, to cause the gating means to retract temporarily to allow a single article to be dispensed, the gating means being actuated during removal of the article to prevent removal of further articles from the same row as the article removed.

- By retaining the articles to be dispensed in a position in which none can be removed without entry of an operator identity casual pilferage can, effectively, be prevented, and, preferably, the dispenser includes means for maintaining a count of the number of articles removed from each row together with the identity of the member of staff removing the article, so that any discrepancies between cash takings and articles sold can very quickly be spotted.

- In addition, the dispenser may include means for receiving a signal from a cash handling system to indicate the receipt into the till of money for the purchase and, after receipt of the signal, enabling dispensing to take place. Thus, an interlock may be provided to prevent dispensing of an article, even after entry of the operator's identity and the selection of an article, unless the appropriate money has been entered as having been put into the cash handling system.

- A signal can also be arranged to be produced when the article is actually removed, to be passed back to say the cash till, to indicate that the row is cleared ready for another

article to be dispensed from the same row.

- Preferably the means for entry of an operator identity and the means for selecting an article to be dispensed comprises a key panel on or attached to the dispenser or may comprise other conventional means such as a magnetically-coded identity card, a physical key, or similar and the means may comprise a cash till itself which may have the requirement for entry of operator identity before it can be operated, an interface and communications channel between the dispenser and the till being provided in such a case.

- Preferably, the means for entry of an operator identity and the means for selecting an article to be dispensed provide signals to an electronic circuit, which includes a microprocessor, and which produces a gate actuation signal.

- Preferably, each gating means comprises a pair of opposed retractable shoulders to engage the front edge of an article at the front of a respective row, the shoulders being withdrawn to enable the row of cigarettes to be pushed forward by a conventional spring biasing means and sensors being provided to sense that the front article has moved and is ready to be sold and to cause the shoulders to return to their initial position whilst removal of the front article is taking place, thereby physically preventing removal of the second article in the row at the same time as the first is removed. A sensor in the form of a switch can provide a signal to indicate removal of the article as mentioned above.

- The shoulders may be spring loaded to their normal position and may be withdrawn by operation of a solenoid in turn actuated by a signal from a microprocessor after entry of the operator's identity and selection of the appropriate article to be dispensed.

- The shoulders may be operated by actuator rods extending substantially parallel to the rows of articles, but the gating means may comprise alternative structures providing the same effect.

- Preferably, at the front of each row, a stop is provided so that when the gating means is retracted the spring bias moves the whole row of articles forward a distance substantially equal to the depth of the article in the axial direction of the row, the stop thus retaining the whole row of articles and being positioned so as to continue to retain the row of articles during removal of the first article in a direction perpendicular to the axis of the row, enabling the gating means to be re-applied to the next article in the row whilst the first article is still being removed, the stop, acting through that first article, retaining the remainder of the row or articles behind the position of the gating means. Preferably the stop is provided by a transparent wall which enables the first article in each row to be seen at all times.

- The rows of articles may be provided in

drawers in a similar manner to that described in GB-A-2154563 and the dispenser is preferably provided with a microprocessor with suitable controls for setting into memory the price of the article in each row, a digital display to indicate the price set and thus to aid the setting of the price of articles for each row, a memory for retaining a count of articles sold and their costs. An output may be fed directly to the cash till so that as an article is removed its sales value is entered and compared with memory of the cash till.

- The dispenser may incorporate a standby electrical power supply in order to maintain the contents of its memory or the memory may be provided in a non-volatile chip or other memory device which does not require power input to maintain its contents intact.

- The dispenser may also incorporate an output port or ports which can be connected to a printing device or hand-held data recorder by means of which the contents of memory can be transferred to the recorder and subsequently by an operator to a computer, used, for example, for order-processing and centralized stock control.

- Alternatively, the output port may be permanently connected to a modem or other communications controlling device so that information held in memory in the dispenser can be read remotely from a central computer. This may be done, for example, by connection to the Outstation Communications Controller of a British Telecom "Bitstream" data line which is capable of providing low speed data communications for telemetering telecontrol and telemonitoring. A central computer may poll a number of such data lines during slack periods, for example, overnight, so as to obtain data from the dispenser to enable reordering and the like as well as stock control and the dispenser may incorporate an alarm circuit, the actuation of which can also be detected by the central computer which may be programmed to alert the police or other security services automatically.

- One example of a dispenser constructed in accordance with the present invention will now be described with reference to the accompanying informal drawings in which:

- Figure 1 is a schematic perspective view of the dispenser;

- Figure 2 is a partial internal plan view of the dispenser;

- Figure 3 is a sectional partial view of the interior of the dispenser along the line III-III in Figure 2;

- Figure 4 is a partial sectional view on the line IV-IV in Figure 3.

- Figure 5 is a block diagram of the control circuitry of the dispenser; and,

- Figure 6 is a diagram of the keyboard and display of the dispenser.

- The example of the dispenser 1 shown in the drawings is designed specifically for dis-

pensing packs of cigarettes 2 and the dispenser has a pair of drawers 3 each of which is arranged to hold five rows 4 of packs of cigarettes 2. A key pad 5 which is connected to a microprocessor (not shown) inside the dispenser 1 is positioned at the front of the dispenser and a liquid crystal or similar type segmented display 6 is positioned immediately above it in order that the operator can see what he has keyed in by means of the key pad.

Each of the drawers 3 is lockable in the dispenser either by means of an externally positioned lock (not shown) or by means of one which may be positioned internally and which can be accessed only through a door or the like which can be opened on entry of a particular code word to the keypad. Each of the drawers 3 has a front transparent wall 7 and below it a number of identification displays or labels 8, one for each row 4 of cigarette packs 2. Each of the drawers has a number of row dividers 4' which, over the greater part of the depth of the drawer, are substantially the full height of the space available for the drawer, but which at the front are stepped down to the level of the front transparent wall 7. Unlike some conventional dispensers the next pack 2 to be dispensed in each row does not lie against the front transparent wall, but is held back from it a distance substantially equal to the thickness of an individual one of the packs 2.

To hold back the rows of cigarette packs 2 a pair of pivotally mounted shoulders 9 are provided, one extending from each row divider 4' on each side of each row. This is shown most clearly in Figure 2 in which the left hand row of packs 2 shown is illustrated in the normal position of display with each of the shoulders 9 extending partially across the front of the row to retain the row of packs. A conventional biasing rear stop 10 is used to bias the row 4 of packs 2 towards the front wall 7.

A switch S is provided at the front of each row in order to sense movement of a pack into and out of the dispensing position at the front of the row.

The right hand row of packs 2 is shown in a dispensing position in which the shoulders 9 are rotated about their pivot axes to a position allowing the front pack to move against the front wall of the drawer 3 for subsequent removal upwards out of the drawer and actuation of the switch S.

Each of the shoulders is actuated by means of a solenoid M which is spring biased to a position in which the shoulders 9 are closed across the row 4 as in the left hand row shown in Figure 2, a linkage 12 which includes a cross bar 13 on the solenoid armature 14 and a link rod 15, connects each shoulder 9 to its respective solenoid M. Each row has a single solenoid which actuates both

shoulders.

Figure 5 shows a block diagram of the electronic control system or monitoring system.

The system comprises a plurality of input/output port integrated circuit chips, known as PIO's, and numbered IC1 to IC4. The ten switches S1-S10 located one in each row of the dispenser are each connected to respective terminals of IC1-IC4 as are the ten relays R1-R10 which are in turn connected to the ten solenoids M1-M10 and the alphanumeric display DS and keyboard KB (shown in Figure 3) are connected as inputs to IC6. IC5 enables the connection of simple security circuits AL which can be wired up in a particular location to provide an alarm signal in the event of unauthorised entry or the like, again the switches being simple make and break type switches actuated to provide an alarm signal.

IC9 and IC10 comprise UART's or universal asynchronous receive/transmit integrated circuit chips to provide for connection to a cash register CR and "Bitstream" OCC BT for remote data monitoring.

IC13 comprises a CMOS-Z80 microprocessor and IC11 and IC12 comprise suitable EPROM and RAM memory respectively, suitable address decoders IC8 and IC17 being provided to control data flow. A power supply unit PS providing voltage regulation, battery backup and clock signals is provided and a further clock IC7 provides signals for display of date and time on the display DS.

The keyboard and display unit shown in detail schematically in Figure 6 comprises a key switch unit KB/5 and segmented alphanumeric display DS/6 containing appropriate keys to enable entry of user identity and, thereafter, input and output of data onto the display by an authorised user. Although shown in Figure 1 as part of the dispenser it may be a separate unit located adjacent the dispenser or remotely or integrated into another unit such as a till. Preferably, there are three levels of authorised use, the first of which will be able to reallocate passwords for the second and third and which will also allow entry to all system functions.

A user, having identified himself, will be able to define the particular row of articles to be worked upon by entry of a suitable number, thereafter functions such as number of articles sold and cash equivalent will be able to be displayed or the price changed etc.

It is envisaged that third level users will be able only to display information and not clear accumulated data for any of the selected articles whereas second level users will be able to clear resettable items only, such as the number of pack sales and the equivalent cash. The first priority user will be able to clear and reset, and authorise second level users by allocating appropriate numerical codes.

Provision of the UART's and connection to a cash register CR or remote connection

through a modem or Bitstream for example enables, in the first case, the value of an article sold to be entered automatically in the cash register without the operator having to insert the value of the article and in the second case enables remote monitoring of data held in the dispenser for checking by a central computer by polling the dispenser at suitable regular times. This type of function will preferably be carried out at night or, less frequently, during the day and will enable monitoring of the alarm circuits and consequential actuation of an alarm to be detected by the central computer which in turn will enable security services to be alerted.

If desired the control system may be configured to sense additional external sales data, such as optic sales of spirits.

In use, in order to enable an article to be dispensed, the operator keys in his identity by means of the key pad 5 after which the microprocessor verifies the identity code enabling the operator then to select a cigarette pack from a particular row for dispensing, again by means of the key pad. The electronic circuit produces a signal to the appropriate solenoid M to draw in the armature, thus moving the linkage 12 and in turn the shoulders 9, so enabling the row of packs to be moved to the front of the drawer and allowing the front pack to be removed by the operator.

The dispenser may be attached to an electronic cash handling system for checking that the money required for the pack of cigarettes has already been entered into the cash handling system and thus enabling dispensing only if the cash handling system has been credited with the cost of the pack of cigarettes.

Each of the shoulders 9 is preferably spring biased to its closed position or holding position and the signal from the electronic circuit is arranged to release the solenoid M via a respective relay R once the row of packs has moved forwards, allowing the shoulders 9 to spring back to the closed position as soon as the front pack has been lifted above the level of the shoulders.

By arranging for the shoulders to be returned to the closed position during the withdrawal movement of the pack being dispensed, the pack following the pack to be dispensed cannot be reached at all until the pack being dispensed has been removed from the drawer, and even then it is held in its withdrawn position in which it is wholly within the drawer and protected from any illicit removal.

The control circuit may be provided with means for detecting loss of electrical power to the device and for providing an indication of same.

CLAIMS

1. A dispensing device for articles of fixed shape, for example, boxes, cartons or tins,

comprising a housing, the housing including means for defining a plurality of rows of the articles to be dispensed, and the dispenser including gating means for retaining the articles to be dispensed in a withdrawn position within the housing such that the articles cannot be removed from the dispenser; means for entry of an operator identity; means for selecting an article to be dispensed; and means for producing a signal following entry of operator identity and selection of an article to be dispensed, to cause the gating means to retract temporarily to allow a single article to be dispensed, the gating means being activated during removal of the article to prevent removal of further articles from the same row as the article removed.

2. A device according to claim 1, which includes means for maintaining a count of the number and value of articles removed from each row and from the machine in total, together with the identity of the member of staff removing each article.

3. A device according to claim 1 or claim 2, which includes means for receiving a signal from a cash handling system to indicate the receipt into the till of money for the purchase and, after receipt of the signal, enabling dispensing to take place.

4. A device according to any of claims 1 to 3, wherein a signal is produced when an article is actually removed, to indicate that the row is cleared ready for another article to be dispensed from the same row.

5. A device according to any of claims 1 to 4, wherein the means for entry of an operator identity and the means for selecting an article to be dispensed comprise a key panel on or attached to the dispenser.

6. A device according to any of claims 1 to 5, wherein the means for entry of an operator identity and the means for selecting an article to be dispensed provide signals to an electronic circuit, which includes a microprocessor, and which produces a gate actuation signal.

7. A device according to any of claims 1 to 6, wherein each gating means comprises a pair of opposed retractable shoulders to engage the front edge of an article at the front of a respective row, the shoulders being withdrawn to enable the row of cigarettes to be pushed forward by a conventional spring biasing means and sensors being provided to sense that the front article has moved and is ready to be sold and to cause the shoulders to return to their initial position whilst removal of the front article is taking place, thereby preventing removal of the second article in the row at the same time as the first is removed.

8. A device according to any of claims 1 to 7, wherein at the front of each row, a stop is provided so that when the gating means is retracted the spring bias moves the whole row of articles forward a distance substantially equal to the depth of the article in the axial

direction of the row, the stop thus retaining the whole row of articles and being positioned so as to continue to retain the row of articles during removal of the first article in a direction perpendicular to the axis of the row, enabling the gating means to be re-applied to the next article in the row whilst the first article is still being removed, the stop, acting through that first article, retaining the remainder of the row or articles behind the position of the gating means.

9. A device according to claim 8, wherein the stop is provided by a transparent wall which enables the first article in each row to be seen at all times.

10. A dispensing device substantially as described with reference to the accompanying drawings.

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